RADON 101

Iowa AIR Coalition

AIR
Public Health Coalition

Mission Statement

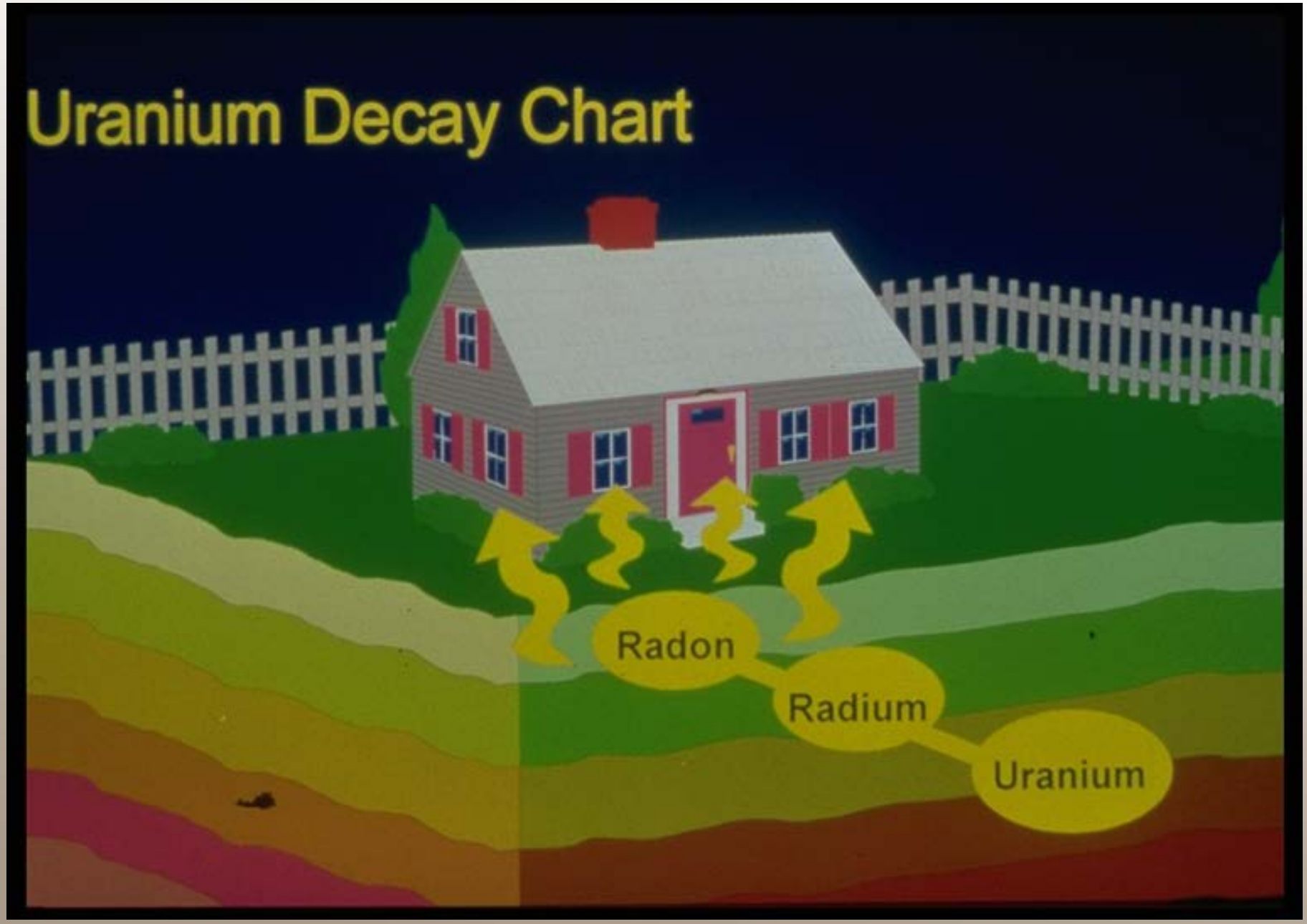
The Iowa AIR Coalition educates and empowers all citizens in their desire to have a healthy and safe indoor environment by consistently providing prevention, promotion, and protection activities across Iowa.

What is radon?

- Radon is a radioactive gas that is colorless, odorless, and tasteless.

What is radon?

- Uranium, a radioactive metal, is naturally found in Iowa soils.
- When uranium decays, it turns into radium, a radioactive metal.
- When radium decays, it turns into radon, a radioactive gas.


Uranium Decay Chart
Radon
Radium
Uranium

Why is radon important?

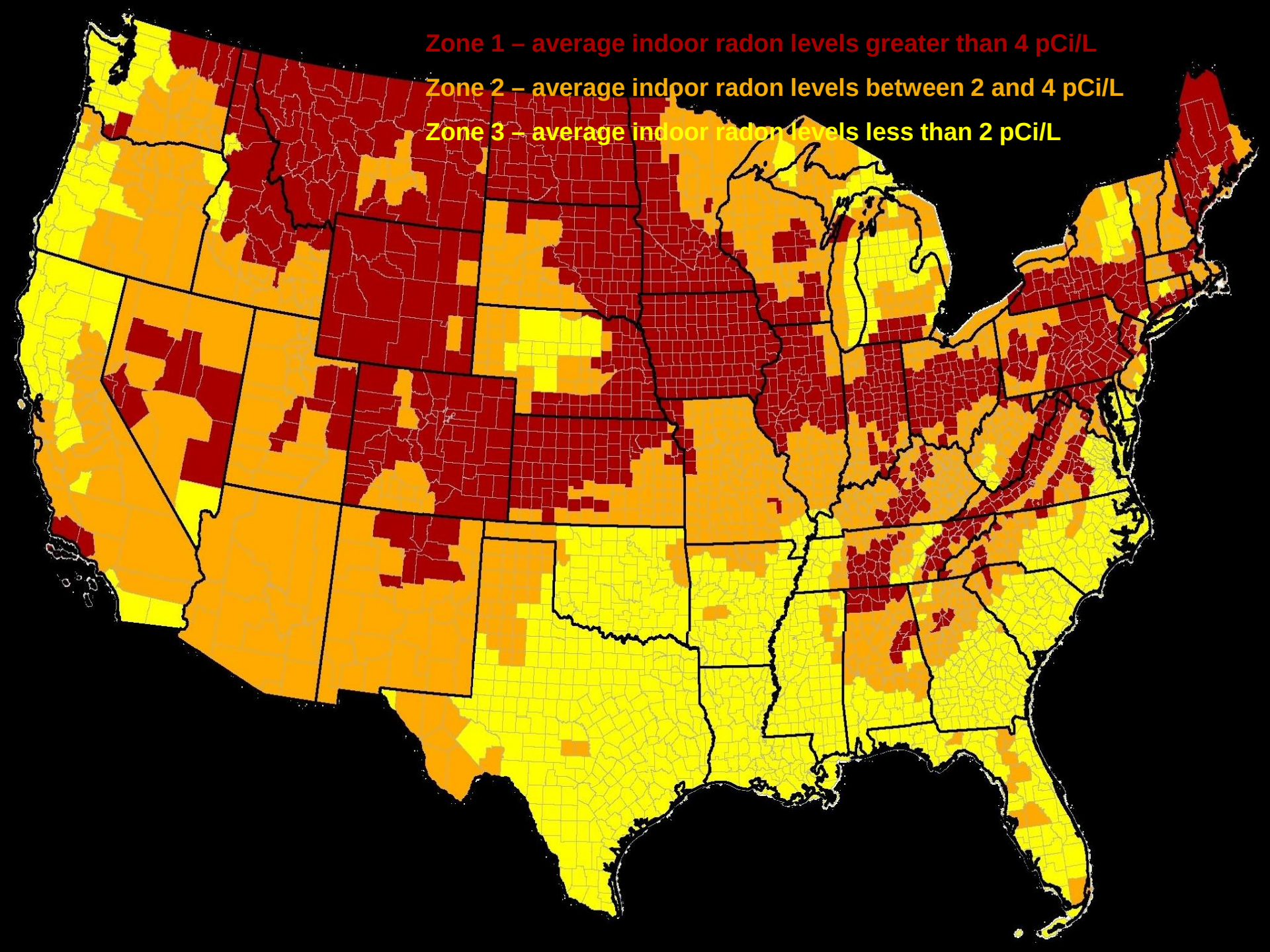
- Radon is the leading cause of lung cancer in non-smokers.
- Radon is repsonsible for ~21,000 deaths each year in the United States and ~400 deaths annually in Iowa.

Why is radon important?

- Iowa has the highest percentage of homes above EPA action level of 4 picocuries per liter (pCi/l).
- As many as 5 in 7 homes in Iowa have radon levels above EPA action level.

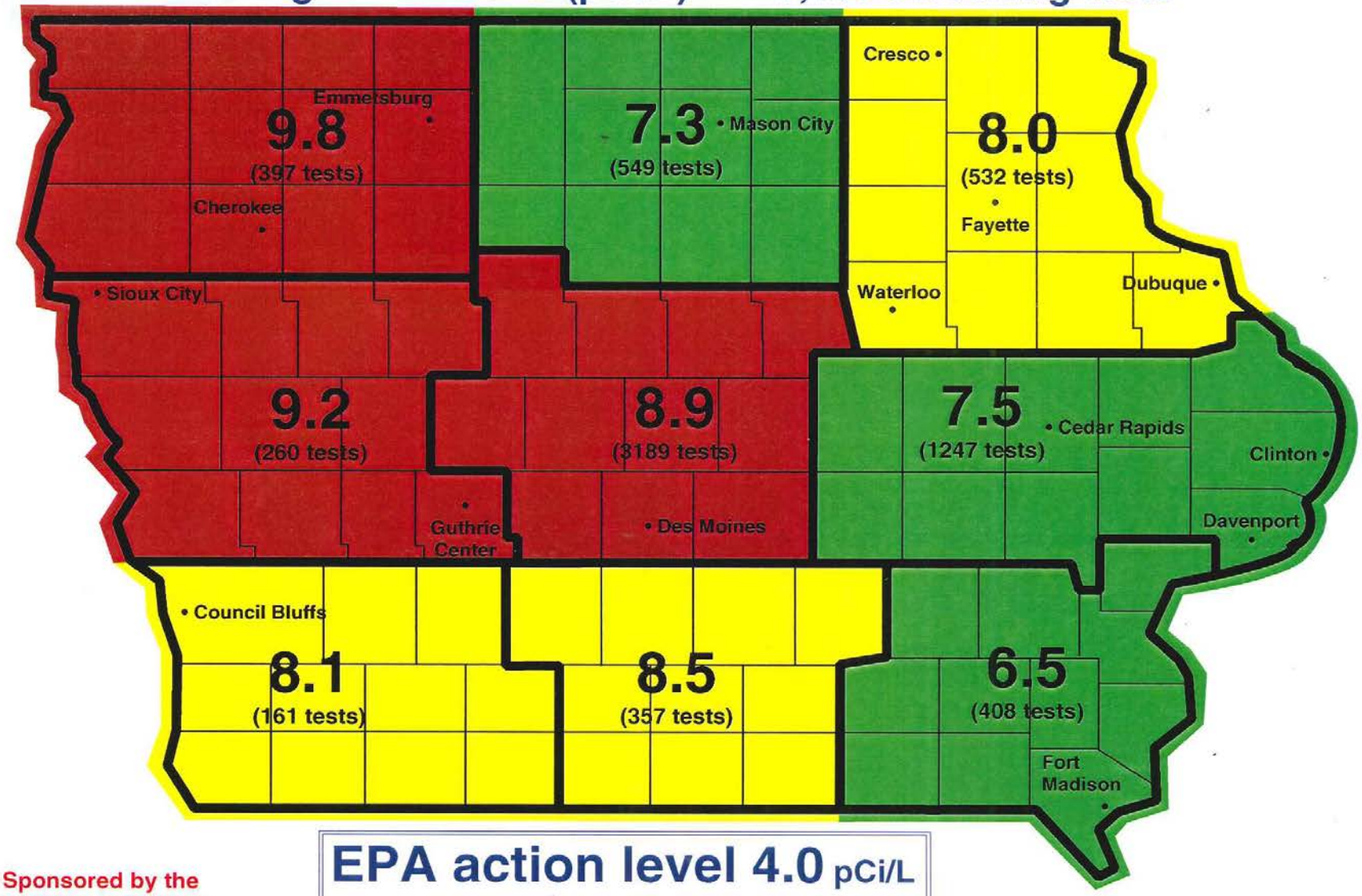
Why is radon important?

- Iowa's indoor radon average is 8 pCi/l according to the Iowa Department of Public Health.


Zone 1 – average indoor radon levels greater than 4 pCi/L
Zone 2 – average indoor radon levels between 2 and 4 pCi/L
Zone 3 – average indoor radon levels less than 2 pCi/L

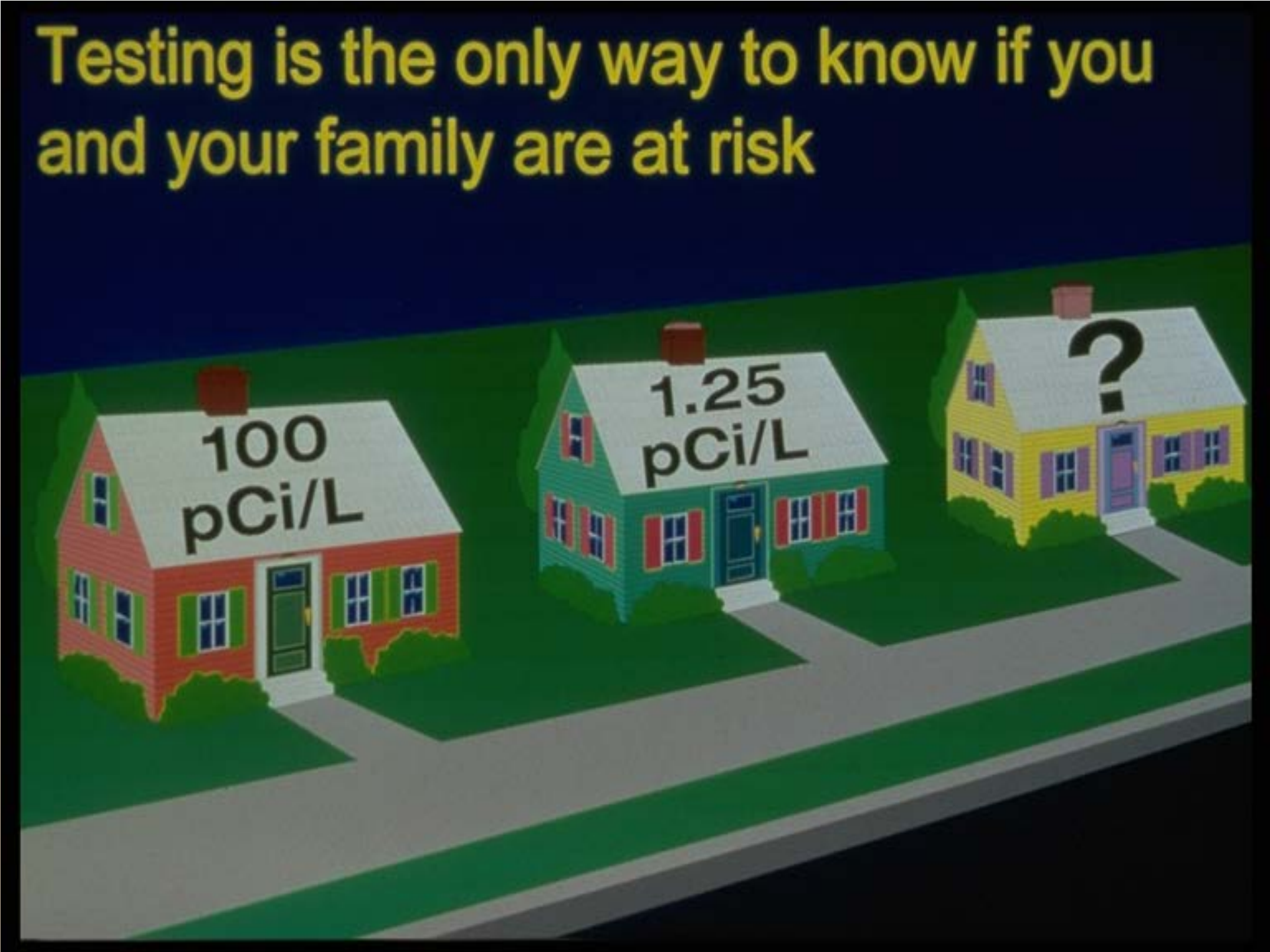
RADON IN IOWA

Average radon level (pCi/L) 7,100 screening tests



EPA action level 4.0 pCi/L

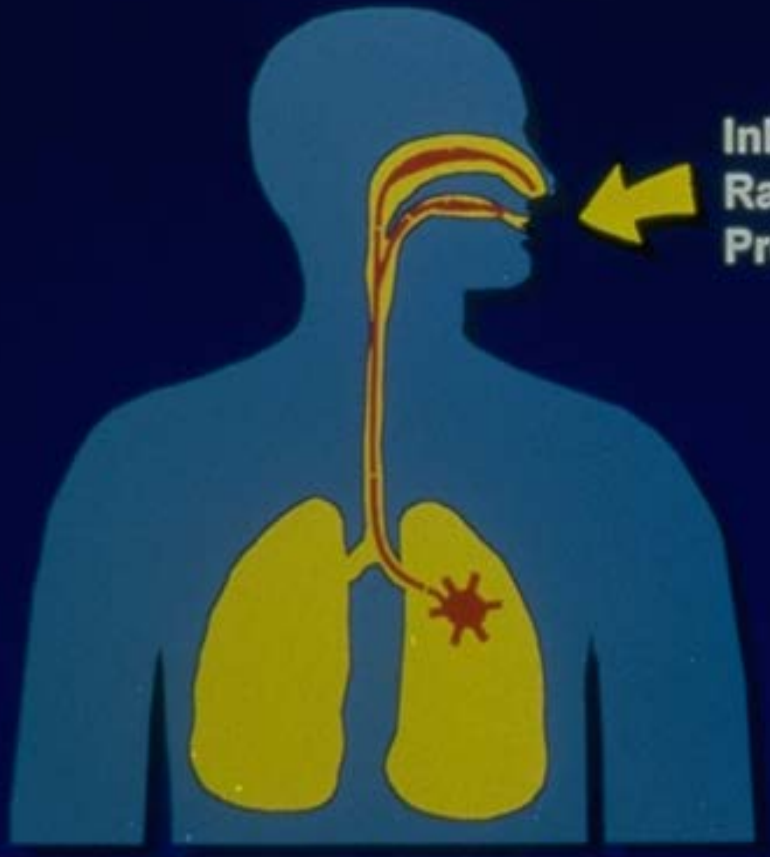
Sponsored by the Iowa Radon Coalition


Testing is the only way to know if you and your family are at risk
100 pCi/L
1.25 pCi/L
?

Health effects of radon

- Radiation emitted from radon enters lungs and causes cellular damage that can lead to cancer.

How Radon Causes Lung Cancer

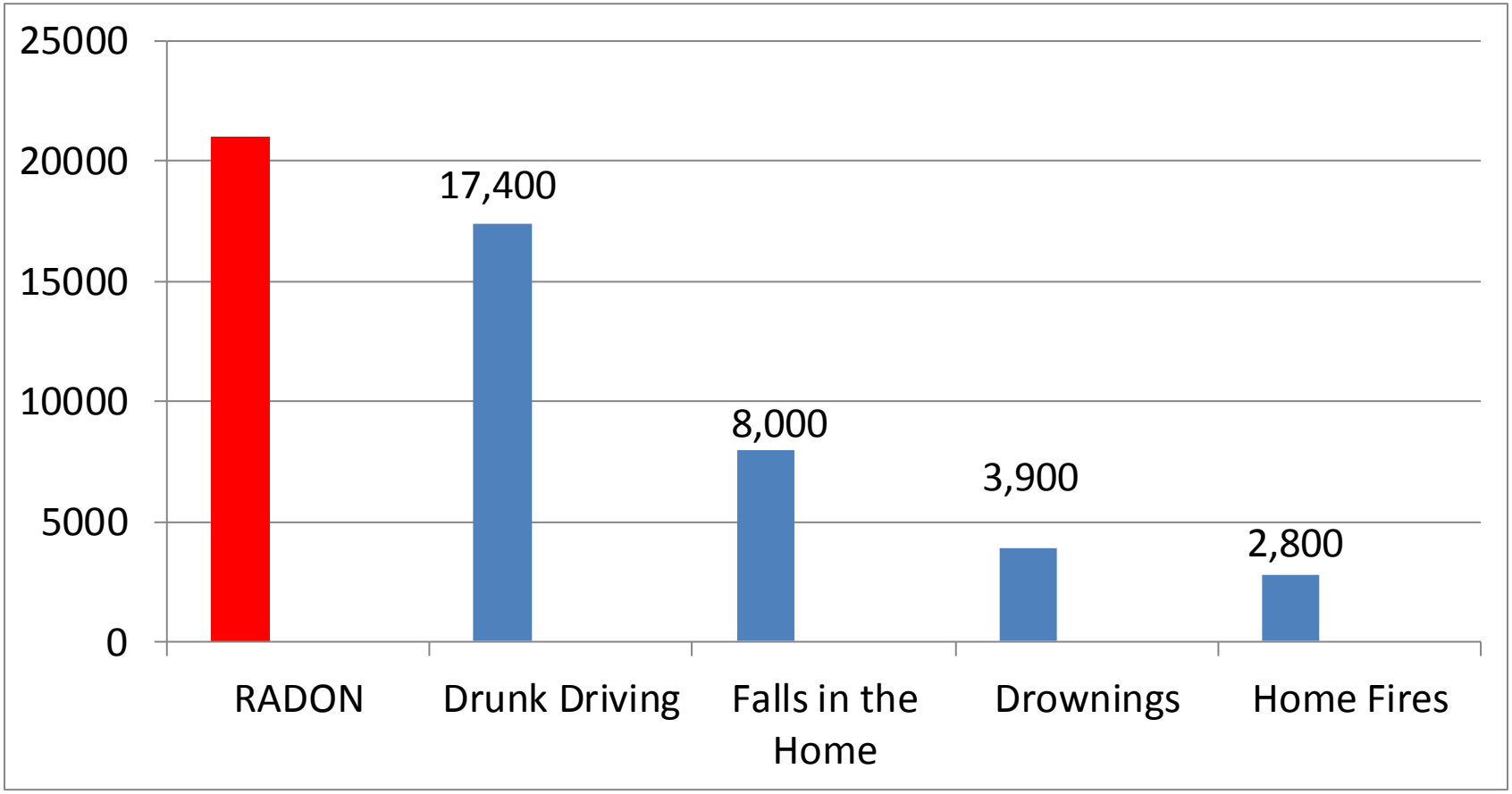


Inhalation of
Radon Decay
Products

Alpha
Particle

Radiation Damage
to DNA

of Deaths Per Year in U.S.



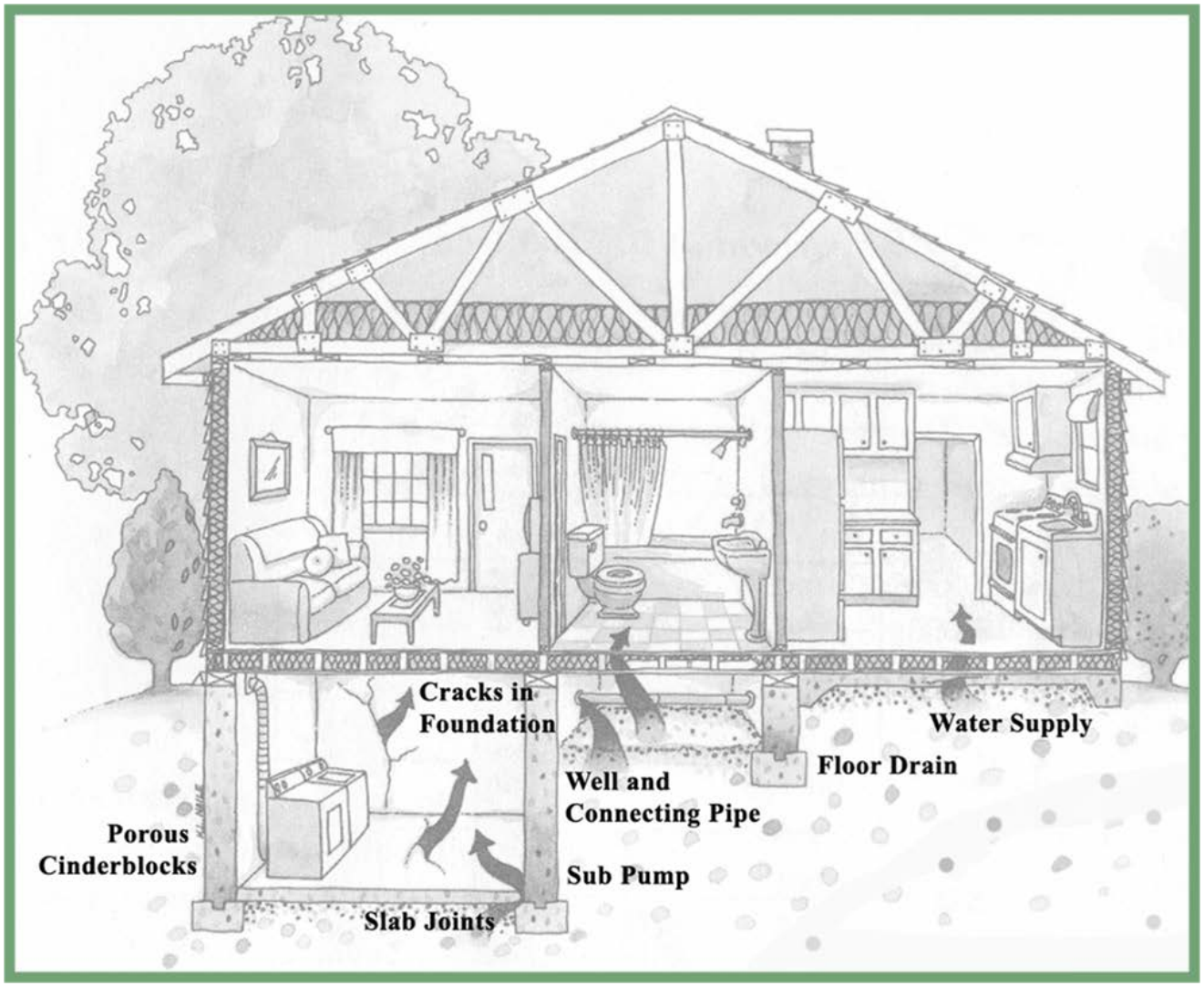
How does radon enter homes?

- Radon enters homes through cracks and openings in the foundation.
- Radon enters homes through unsealed sump pumps, and concrete cold joints.

How does radon enter homes?

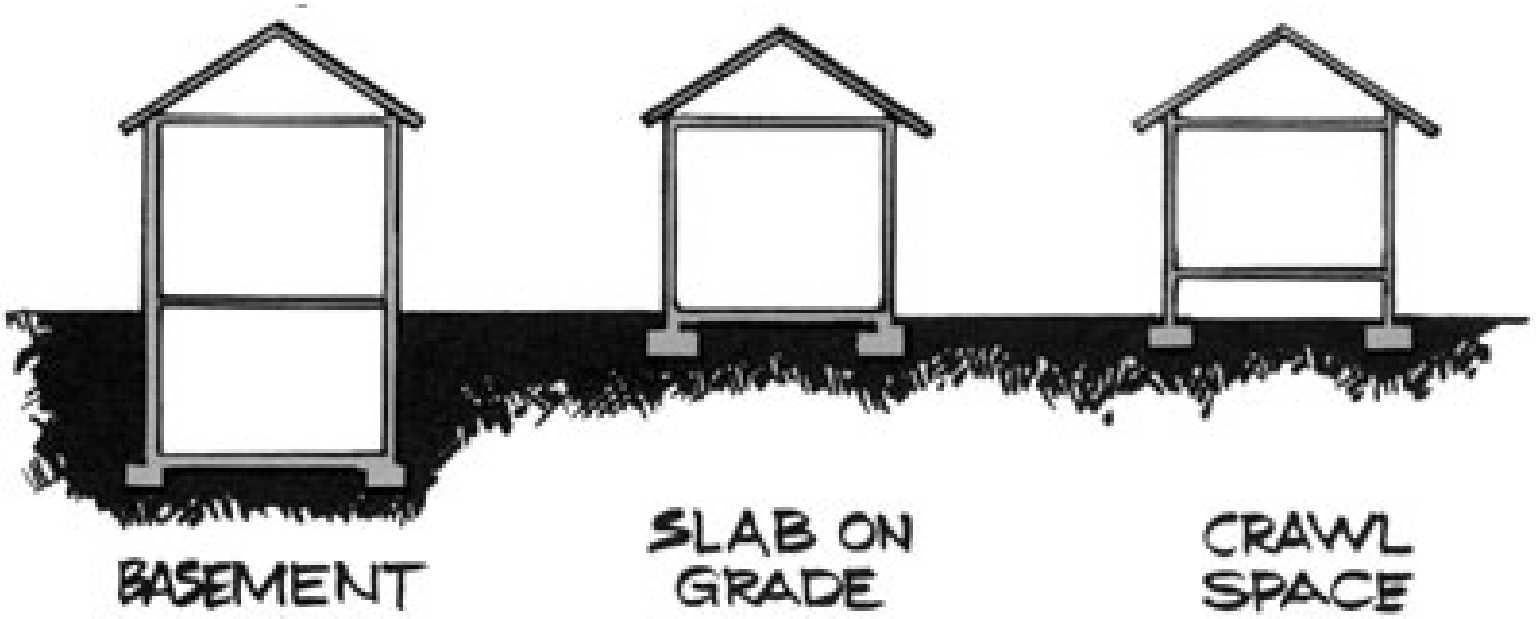
- Homes have lower air pressure than the surrounding soil. This creates a vacuum effect allowing radon to enter the home even through hairline cracks.

How Does Radon Enter My Home



But I Don’t Have a Basement

- **ANY** building in **contact** with the ground can have elevated radon levels.



How does radon enter homes?

- Radon can also enter homes in groundwater.
- Public water supplies in Iowa have not been shown to have radon concentrations high enough to be of concern.

Testing for Radon

- Testing for radon can be done using do-it-yourself kits or by a certified radon measurement specialist.
- For real-estate transactions, testing should be completed by a certified radon measurement specialist.

Testing for Radon

- Short-term do-it yourself kits are available for less than 10 dollars. Contact your local AIR Coalition Member at:

- It takes only a few minutes to read instructions and place kit. Short-term tests are typically run for 2 to 7 days.

Testing for Radon

- Long-term test kits are available for less than 30 dollars.
- Long-term kits are typically placed in the home for three months to one year.

Testing for Radon

- Do-it-yourself test kits are easy and should only take a few minutes of your time.
- Read the instructions carefully prior to placing test kit.

Testing for Radon

- Place the test kit on the lowest part of your home where you regularly spend time. If you don’t spend much time in the basement, consider testing the first floor of home.

Testing for Radon

- Family rooms, dens, and bedrooms are ideal test locations.
- Test kit should be hung from ceiling within the normal breathing zone (2 to 6 feet from floor.)

Testing for Radon

- Windows and doors should be shut during the time the short-term kit is placed except for normal entry/exit of the home.

Testing for Radon

- Do not place near a heat source.
- Do not test areas of high humidity such as bathrooms and kitchens.
- Do not place in a draft. Do not operate a fan in the room where a test kit is placed.

Testing for Radon

- For short-term tests, it is recommended that a second short-term test is run during a different season if results are below EPA action level 4.0 pCi/l.

Testing for Radon

- For long-term kits, conduct during part or all of winter months to determine highest concentrations of radon in home.

What do the results mean?

- If results are less than 1.9 pCi/l, no further action is recommended.

What do the results mean?

- If results are 2 to 3.9 pCi/l, levels are below EPA action level (4.0 pCi/l).
  - Continue to monitor by retesting every 2 years or if building conditions change.
  - Consider fixing your home at this level.

What do the results mean?

- If results are 4.0 to 9.9 pCi/l, conduct either a long-term test or a second short term test:
  - For a better understanding of your year-round average radon level, take a long-term test.
  - If you need results quickly, take a short-term test.

What do the results mean?

- If confirmation results are 4.0pCi/l or greater ~~to 9.9~~ and you followed up with a long-term test ~~kit~~, fix your home
- If confirmation results are 4.0 pCi/lor greater ~~to 9.9~~ and you followed up with a short-term test kit, fix your home if the average of your first and second test is 4 pCi/l or higher.

What do the results mean?

- If results are 8 pCi/l or above for a short-term test, immediately conduct another short-term test.
- If confirmation results are in this range, actions should be taken to reduce radon levels.

What do the results mean?

- If results are greater than 80 pCi/l, contact Iowa Department of Public Health or your local health department for assistance.

What do the results mean?

Assessment of Risk from		
	For every 1,000 people exposed to this radon level[1], about this many will die of lung cancer:	
	never-smokers	smokers
20 pCi/L	36	260
10 pCi/L	18	150
8 pCi/L	15	120
4 pCi/L[2]	7.3	62
2 pCi/L	3.7	32
0.4 pCi/L[3]	0.7	6.4

1. Assumes lifelong exposure at this level
2. Recommended EPA action level.
3. Approximate average outdoor radon level.

*Mortality estimates in this presentation are from the EPA publication *Assessment of Risk from Radon in Homes* (2003)

- Reducing radon from 20 pCi/L to 2 pCi/L reduces lung cancer death about 90% for both smokers and non-smokers.
- Put another way, it would reduce lung cancer deaths in nonsmokers from 1 in 28 to 1 in 270.
- It would reduce lung cancer deaths in smokers from 1 in 4 to 1 in 31.

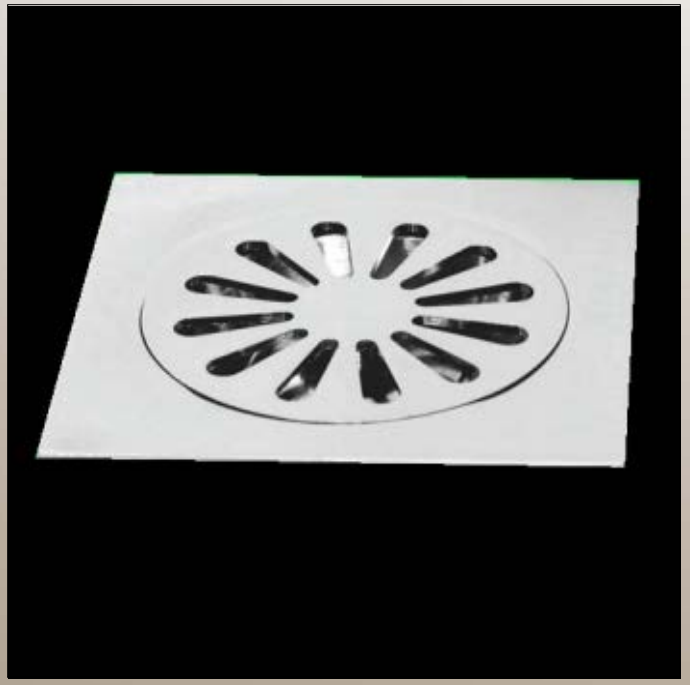
Reducing radon levels

- Seal sump pumps.

Sealed sump pit lids are available in building supply stores. In many cases, installing a sealed sump lid is the most cost-effective radon control measure.

Reducing radon levels

- Ensure basement floor drains are working properly.



Reducing radon levels

- Seal cracks in basement walls, floor, masonry joints, and floor/wall joints.
- Seal crawl spaces.

Reducing radon levels

- Install an active mitigation system. Iowa allows homeowners to install, but it is recommended that it be completed by a credentialed radon mitigation specialist.

Radon mitigation system

- A typical radon mitigation system involves installing a suction pipe through basement floor or sump pump lid, gaining access to soil below.

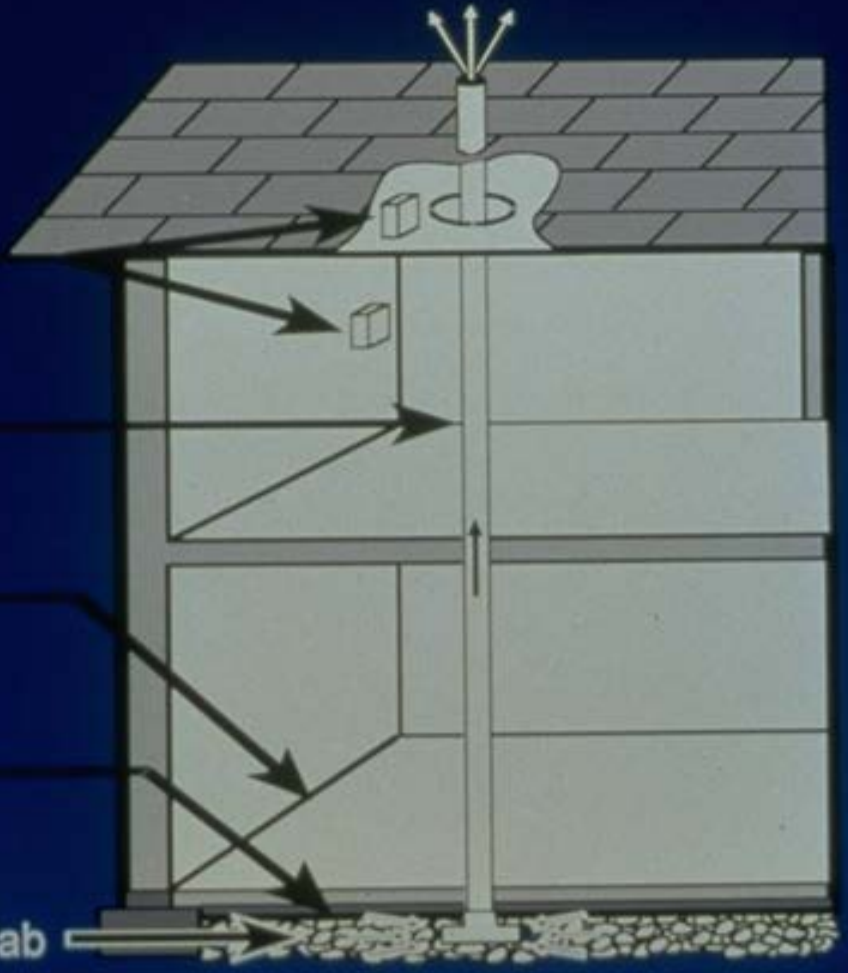
Radon mitigation system

- A constantly running inline fan creates a low pressure zone under the floor drawing radon out and discharging it to the outside air above the eve of the house, where it dissipates harmlessly.

New construction

- Passive radon mitigation systems can be added to new homes for a cost of less than $800. Guidelines can be found on IDPH or EPA websites.

Basic Components of Passive System



Radon laws in Iowa

- Anyone who is paid to do radon testing, analyzing, or install mitigation systems must be certified by Iowa Department of Public Health (Iowa Code Chapter 136B.)

Radon laws in Iowa

- Child care centers must be tested for radon within one year of initial licensing and every two years after initial testing.

Radon laws in Iowa

- Iowa has a disclosure law for the seller to indicate the known presence of radon.
- Iowa also has a new rule which requires realtors to give home buyers and seller a radon fact sheet to make them aware of the potential presence & danger of radon in the home they're considering purchasing.

Questions?

Mindy Uhle, MPH, HHS
Community Health Consultant | Bureau of Environmental Health Services | Division of Environmental Health | Iowa Department of Public Health |
321 E. 12th St | Des Moines, IA 50319 |
Office: 515-242-6131 |
Melinda.Uhle@idph.iowa.gov